Claims:

1. A synthetic protein copolymer having selected plastic and elastic properties comprising at least one hydrophilic block and at least one hydrophobic block.

2. The protein copolymer of claim 1 having a first hydrophobic end block, a second hydrophobic end block, and a middle hydrophilic block, wherein said first and second end blocks are substantially identical.

3. The protein copolymer of claim 1 wherein the first end block comprises a nucleic acid sequence capable of encoding an amino acid sequence of $[VPAVG(IPAVG)_4]_n$ or $[(IPAVG)_4(VPAVG)]_n$.

4. The protein copolymer of claim 3 wherein the middle block comprises a nucleic acid sequence capable of encoding an amino acid sequence selected from the group consisting of: $[(VPGEG)\ (VPGVG)_4]_m$, $[(VPGVG)_4(VPGEG)]_m$, and $[(VPGVG)_2VPGEG(VPGVG)_2]_m$.

5. The protein copolymer of claim 4 wherein n is from about 5 to about 100 and wherein m is from about 10 to about 100.

6. The protein copolymer of claim 5 wherein n is about 16.

7. The protein copolymer of claim 6 wherein the middle block is selected from the group consisting of: VPGVG $[VPGVG(VPGIGVPGVG)_2]_{19}$VPGVG; VPGVG $[(VPGVG)_2VPGEG(VPGVG)_2]_{30}$VPGVG; VPGVG $[(VPGVG)_2VPGEG(VPGVG)_2]_{38}$VPGVG; VPGVG $[(VPGVG)_2VPGEG(VPGVG)_2]_{48}$VPGVG; VPGVG $[VPGVG(VPNVG)_4]_{12}$VPGVG; VPGVG $[(APGGVPGGAPGG)_2]_{23}$VPGVG; VPGVG $[(APGGVPGGAPGG)_2]_{30}$VPGVG; $[VPGVG(IPGVGVPGVG)_2]_{19}$; $[VPGEG(VPGVG)_4]_{30}$; $[VPGEG(VPGVG)_4]_{48}$; $[(APGGVPGGAPGG)_2]_{22}$; and $[(VPGMG)_5]_x$, wherein x is from about 10 to about 100.

8. The protein copolymer of claim 1 capable of elongation up to about 14 times its initial length.

9. The protein copolymer of claim 1 cast as a film.

10. The film of claim 9 comprising a plurality of layers.

11. The multi-layered film of claim 10 comprising a first layer and a second layer, wherein the first layer derives from a first polymer exposed to a first solvent, and the second layer derives from a second polymer exposed to a second solvent, thereby creating a film having a desired mechanical property.

12. The multi-layered film of claim 11 wherein the first polymer and the second polymer are substantially identical.

13. The multi-layered film of claim 11 wherein the first solvent enhances film elasticity and the second solvent enhances film plasticity.

14. The multi-layered film of claim 11 wherein the first solvent is water and the second solvent is trifluoroethanol.

15. The protein copolymer of claim 1 in gel form.

16. The protein copolymer of claim 1 in the form of a fiber or fiber network.

17. The fiber network of claim 16 comprising a first fiber and a second fiber, wherein the first fiber derives from a polymer exposed to a first solvent and the second fiber derives from a polymer exposed to a second solvent.

18. A method of generating a medical implant having a selected mechanical property comprising applying the fiber of claim 16 to the implant.

19. A method for producing a plastic elastic protein copolymer comprising the steps of

    a. providing a first block of nucleic acid sequence, wherein said first block encodes a hydrophilic protein;

b. providing a second block of nucleic acid sequence, wherein said second block encodes a hydrophobic protein;

c. synthesizing a nucleic acid molecule comprising said first and second blocks; and

d. expressing said nucleic acid molecule to produce said protein copolymer.

20. The method of claim 19 further comprising solubilizing said protein copolymer in a solvent, thereby creating a solution, and bringing said solution to a temperature to cause said copolymer to agglomerate to form a non-covalently crosslinked mass.

21. The method of claim 20 further comprising covalently crosslinking said polymer.

22. A method of delivery of a drug or biological agent via a stent, embolization coil, vascular graft, or other implanted biomedical device comprising the method of claim 20 and further comprising the steps of

e. including the drug or biological agent in the solvent, thereby making a mixture with said copolymer; and

f. applying said mixture to said stent, embolization coil, vascular graft, or other implanted biomedical device.